

05/28/14

CONTRACT NO.: DA00202 WBS ELEMENT: ICR.10661.28

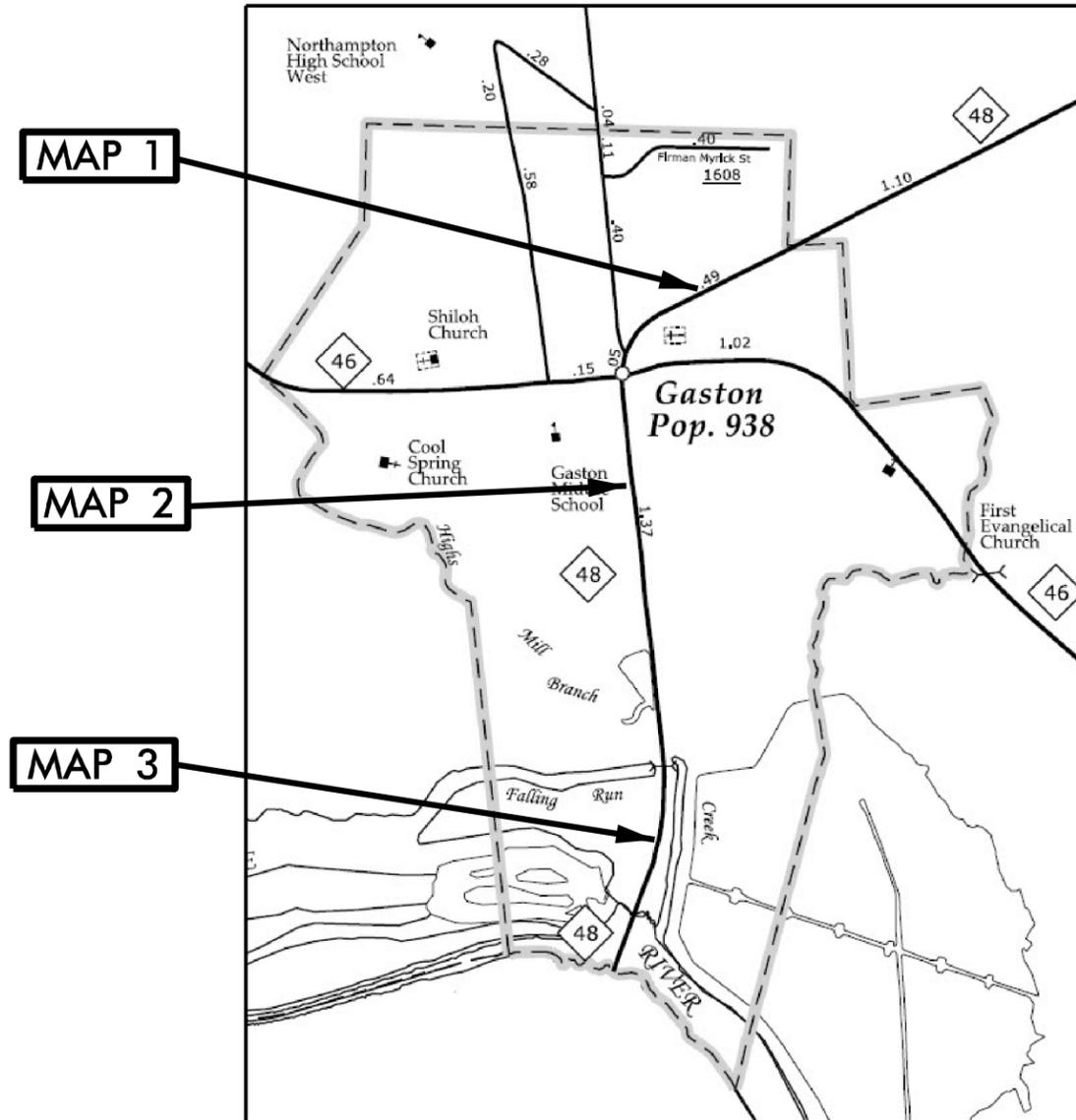
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**NORTHAMPTON COUNTY**

LOCATION: MAP 1 NC 48 FROM GASTON ECL TO NC 46  
MAP 2 NC 48 FROM NC 46 TO END C&G  
MAP 3 NC 48 FROM END C&G TO ROANOKE RIVER BRIDGE

TYPE OF WORK: MILLING AND RESURFACING

| STATE           | STATE PROJECT REFERENCE NO. | SHEET NO.   | TOTAL SHEETS |
|-----------------|-----------------------------|-------------|--------------|
| N.C.            | ICR.10661.28                | 1           | 11           |
| STATE PROJ. NO. | P.A. PROJ. NO.              | DESCRIPTION |              |
| ICR.10661.28    |                             | MAP 1       |              |
| ICR.10661.28    |                             | MAP 2       |              |
| ICR.10661.28    |                             | MAP 3       |              |



**NTS**

**PROJECT LENGTH**

LENGTH OF ROADWAY PROJECT MAP 1 = 0.54 MI.  
 LENGTH OF ROADWAY PROJECT MAP 2 = 0.51 MI.  
 LENGTH OF ROADWAY PROJECT MAP 3 = 0.68 MI.  
 TOTAL = 1.73 MI.

Prepared in the Office of:  
**DIVISION OF HIGHWAYS**

113 Airport Dr., Edenton NC, 27932

2012 STANDARD SPECIFICATIONS

LETTING DATE:  
AUGUST 27, 2014

**W.B. HOBBS, P.E.**  
DIVISION PROJECT MANAGER

**C.E. SLACHTA**  
DIVISION PROPOSALS ENGINEER

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA



PAVEMENT SCHEDULE

|    |  |
|----|--|
| C1 | PROP. APPROX. 2.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD. |
| V1 | MILLING BITUMINOUS PAVEMENT. 2.0" IN DEPTH.  |
| T  | EARTH MATERIAL   |
| U  | EXISTING PAVEMENT.   |

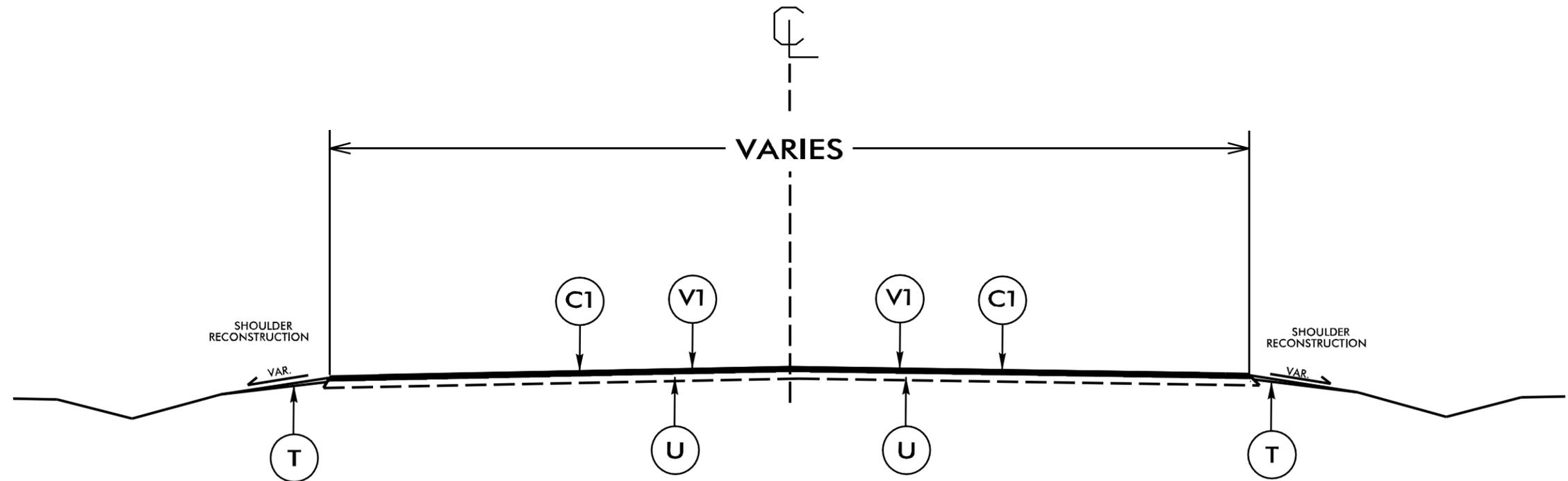
NOTES:

\*ALL PAVED S.R. ROADS TO BE RESURFACED TO THE ENDS OF THE RADII, OR AS DIRECTED BY THE ENGINEER

\*EDGES, PAVEMENT WIDENING, INTERSECTIONS, AND BRIDGE FLARES ARE INCLUDED IN THE SUMMARY OF QUANTITIES

\*INDUCTIVE LOOPS SHALL BE INSTALLED PRIOR TO THE FINAL LIFT OF SURFACE BEING PLACED

|                       |           |
|-----------------------|-----------|
| PROJECT REFERENCE NO. | SHEET NO. |
| 1CR.10661.28          | 2 of 11   |



TYPICAL SECTION NO.1

USE WITH MAP 1

NTS

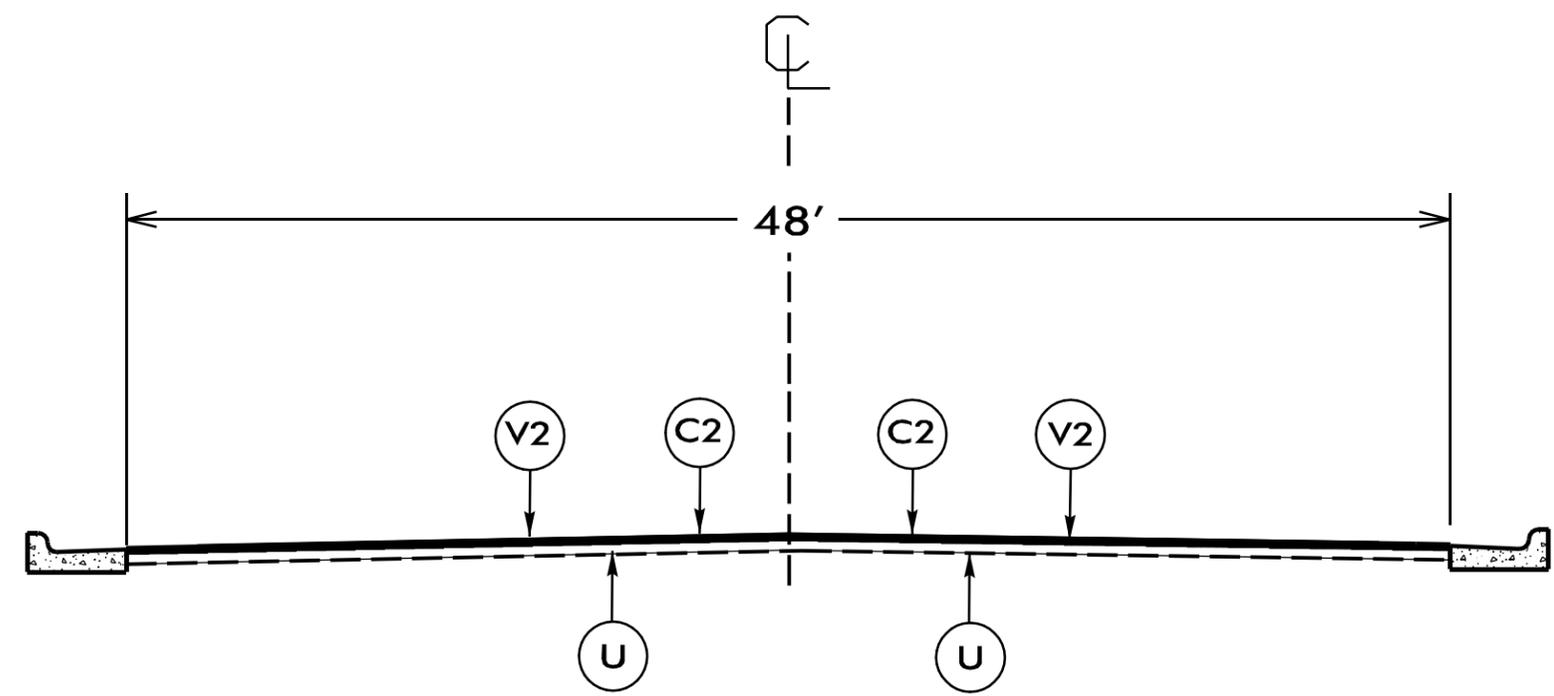
SYSTEMS DESIGN

PAVEMENT SCHEDULE

|    |  |
|----|--|
| C2 | PROP. APPROX. 2.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD. |
| V2 | MILLING BITUMINOUS PAVEMENT. 2.0"- 5.0" IN DEPTH.  |
| U  | EXISTING PAVEMENT.   |

NOTES:

- \*ALL PAVED S.R. ROADS TO BE RESURFACED TO THE ENDS OF THE RADII, OR AS DIRECTED BY THE ENGINEER
- \*EDGES, PAVEMENT WIDENING, INTERSECTIONS, AND BRIDGE FLARES ARE INCLUDED IN THE SUMMARY OF QUANTITIES
- \*CONTRACTOR SHALL MILL 2.0" BELOW EXISTING EDGE OF CONC. CURB & GUTTER
- \*INDUCTIVE LOOPS SHALL BE INSTALLED PRIOR TO THE FINAL LIFT OF SURFACE BEING PLACED



**TYPICAL SECTION NO.2**

USE WITH MAP 2

NTS

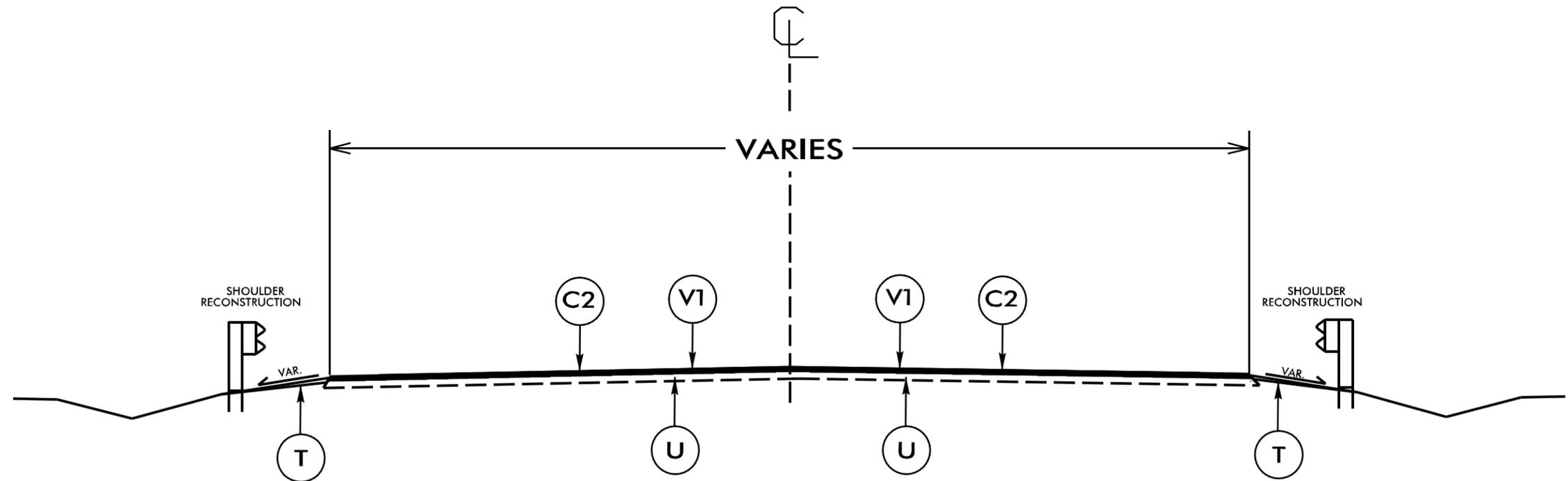
SYSTEMS DESIGN

PAVEMENT SCHEDULE

|    |  |
|----|--|
| C2 | PROP. APPROX. 2.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD. |
| V1 | MILLING BITUMINOUS PAVEMENT. 2.0" IN DEPTH.  |
| T  | EARTH MATERIAL   |
| U  | EXISTING PAVEMENT.   |

NOTES:

- \*ALL PAVED S.R. ROADS TO BE RESURFACED TO THE ENDS OF THE RADII, OR AS DIRECTED BY THE ENGINEER
- \*EDGES, PAVEMENT WIDENING, INTERSECTIONS, AND BRIDGE FLARES ARE INCLUDED IN THE SUMMARY OF QUANTITIES
- \*CONTRACTOR SHALL TIE PROPOSED GUARDRAIL TO THE EXISTING BRIDGE ANCHOR UNITS
- \*ALL PROPOSED STEEL BEAM GUARDRAIL SHALL BE INSTALLED UTILIZING 8-FT EXTRA LENGTH POSTS



TYPICAL SECTION NO.3

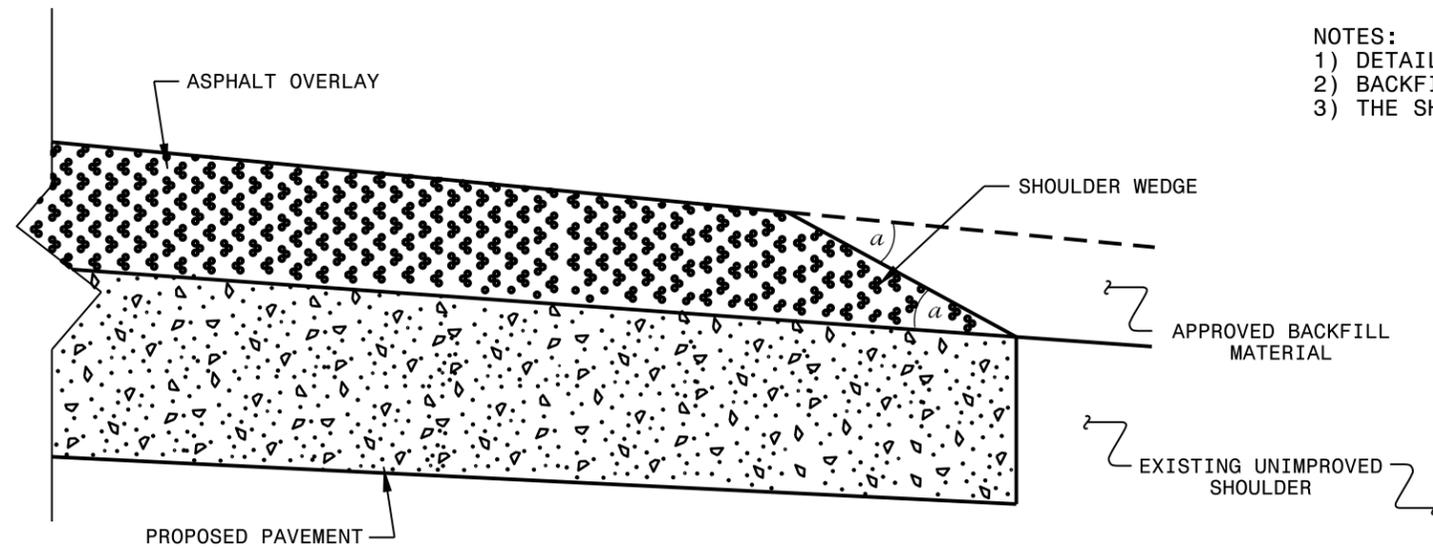
USE WITH MAP 3

NTS

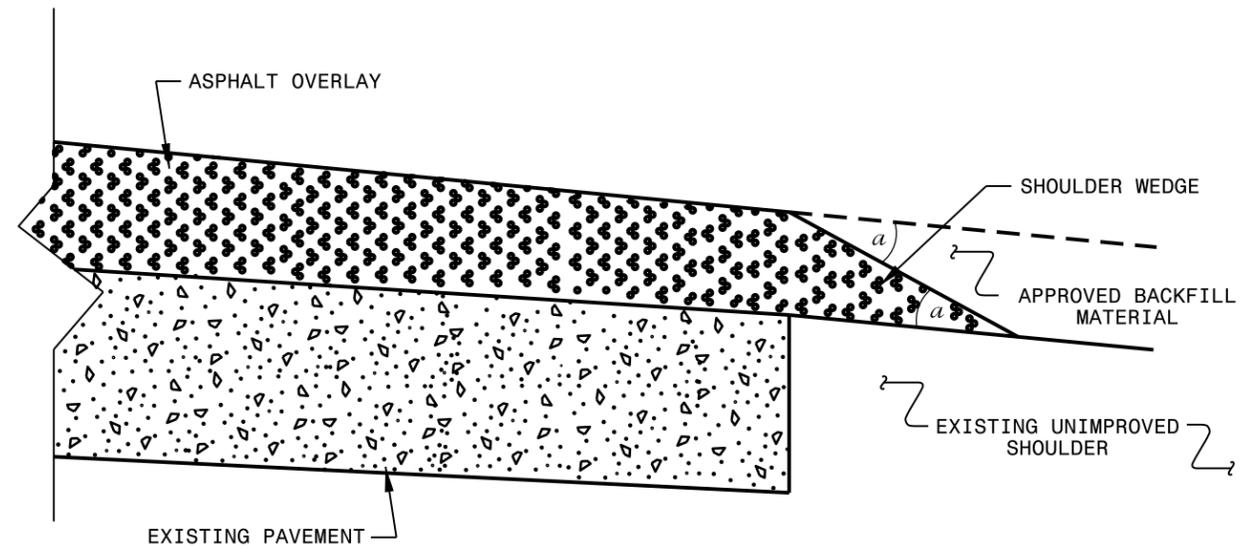
SYSTEMS DESIGN



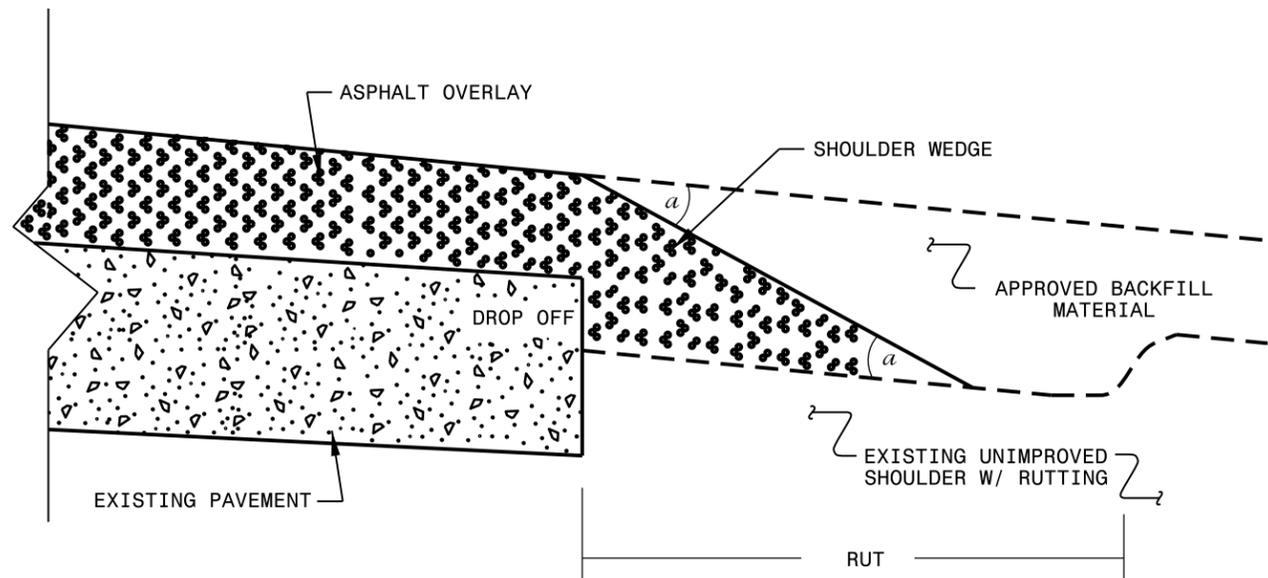
- NOTES:
- 1) DETAIL DOES NOT APPLY TO OGAFc AND ULTRA-THIN BONDED WEARING COURSE.
  - 2) BACKFILL SHOULDER WITH APPROVED MATERIAL.
  - 3) THE SHOULDER WEDGE DEVICE MAY BE DISENGAGED AT PAVED DRIVEWAYS AND SIDE STREETS.



**SHOULDER WEDGE DETAIL**  
(Resurfacing Projects w/ Widening or  
with Existing Paved Shoulder having no dropoffs)



**SHOULDER WEDGE DETAIL**  
(Resurfacing Projects w/ NO Widening)



**SHOULDER WEDGE DETAIL**  
(Resurfacing Adjacent to  
Rutted Shoulder)

- SHOULDER WEDGE ANGLE = 30°

|  |                  |
|--|------------------|
| <b>CONTRACT STANDARDS<br/>AND DEVELOPMENT UNIT</b>     |                  |
| Office 919-707-6950                                    | FAX 919-250-4119 |
| <b>SHOULDER WEDGE<br/>DETAILS</b>                      |                  |
| ORIGINAL BY: T.SPELL                                   | DATE: 7-19-11    |
| MODIFIED BY:   | DATE: 10/16/12   |
| CHECKED BY:  | DATE:            |
| FILE SPEC.: susr/details/stand/shoulderwedgedetail.dgn |                  |

SYSTEMS DESIGN  
USER NAME

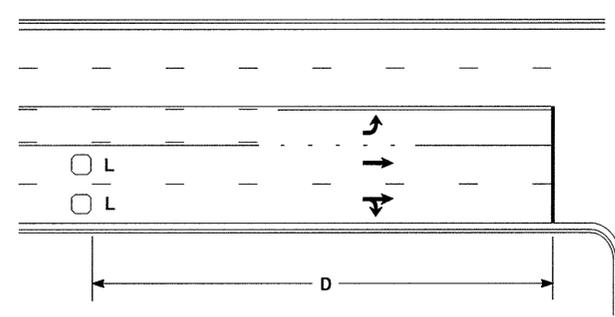
|              |           |           |
|--------------|-----------|-----------|
| PROJECT NO.  | SHEET NO. | TOTAL NO. |
| 1CR.10661.28 | 7         | 11        |

### SUMMARY OF QUANTITIES

| PROJECT NO         | COUNTY      | MAP NO | ROUTE | DESCRIPTION                          | TYP | LANES | LANE TYPE | FINAL SURFACE TESTING REQUIRED | WARM MIX ASPHALT REQUIRED | LENGTH M    | WIDTH FT | MOBILIZATION LS | BORROW CY | INCIDENTAL STONE BASE TONS | SHOULDER RECONSTRUCTION SM | 2" MILLING SY | 2" TO 5" MILLING SY | SURFACE COURSE, S9.5B TONS | SURFACE COURSE, S9.5C TONS | ASPHALT BINDER FOR PLANT MX TONS | AC PLANT MX (REPAIR) TONS | 2'-6" CURB & GUTTER LF | 5" MONOLITHIC CONCRETE ISLANDS (KEYED IN) SY | ADJUSTMENT OF MANHOLES EA | ADJUSTMENT OF METER OR VALVE BOX EA | STEEL BEAM GUARDRAIL LF | GUARDRAIL ANCHOR UNITS, TYPE 350 (TL-2) EA | REMOVE EXISTING GUARDRAIL LF | TEMPORARY SILT FENCE LF | MATTING FOR EROSION CONTROL SY | COIR FIBER WATTLE LF | POLYACRYLAMIDE (PAM) LB | SEED & MULCHING AC |   |  |  |
|--------------------|-------------|--------|-------|--------------------------------------|-----|-------|-----------|--------------------------------|---------------------------|-------------|----------|-----------------|-----------|----------------------------|----------------------------|---------------|---------------------|----------------------------|----------------------------|----------------------------------|---------------------------|------------------------|--|---------------------------|-------------------------------------|-------------------------|--|------------------------------|-------------------------|--------------------------------|----------------------|-------------------------|--------------------|---|--|--|
| 1CR.10661.28       | Northampton | 1      | NC 48 | FROM GASTON ECL TO NC 46             | 1   | 2     | 2WU       | NO                             | NO                        | 0.54        | 27       | 0.312           | 20        | 15                         | 1.08                       | 9,000         |                     | 1,065                      |                            | 64                               |                           |                        |  | EA                        | 3                                   |                         | EA   |                              | LF                      | 50                             | 8                    | 20                      | 1                  | 1 |  |  |
| 1CR.10661.28       | Northampton | 2      | NC 48 | FROM NC 46 TO END C&G                | 2   | 2     | MU        | NO                             | NO                        | 0.51        | 48       | 0.295           |           |                            |                            |               | 17,000              |                            | 1,920                      | 113                              | 400                       | 190                    | 170  | 5                         | 4                                   |                         |  |                              |                         |                                |                      |                         |                    |   |  |  |
| 1CR.10661.28       | Northampton | 3      | NC 48 | FROM END C&G TO ROANOKE RIVER BRIDGE | 3   | 2     | 2WU       | NO                             | NO                        | 0.68        | 26       | 0.393           | 30        | 30                         | 1.36                       | 10,800        |                     |                            | 1,258                      | 74                               |                           |                        |  |                           |                                     | 6,400                   | 4  | 6,400                        | 6,400                   | 100                            | 200                  | 7                       |                    | 1 |  |  |
| <b>GRAND TOTAL</b> |             |        |       |                                      |     |       |           |                                |                           | <b>1.73</b> |          | <b>1</b>        | <b>50</b> | <b>45</b>                  | <b>2.44</b>                | <b>19,800</b> | <b>17,000</b>       | <b>1,065</b>               | <b>3,178</b>               | <b>251</b>                       | <b>400</b>                | <b>190</b>             | <b>170</b>                                   | <b>5</b>                  | <b>7</b>                            | <b>6,400</b>            | <b>4</b>                                   | <b>6,400</b>                 | <b>6,450</b>            | <b>108</b>                     | <b>220</b>           | <b>8</b>                | <b>2</b>           |   |  |  |

| PROJECT NO         | COUNTY      | MAP NO | ROUTE | DESCRIPTION                          | TYP | LANES | LANE TYPE | LENGTH | WIDTH | TEMPORARY TRAFFIC CONTROL | 4" X 90 M WHITE THERMO | 4" X 120 M YELLOW THERMO | 4" X 120 M WHITE THERMO | 8" X 90 M YELLOW THERMO | 24" X 120 M WHITE THERMO | THERMO M&G SCHOOL 120 M | THERMO M&G ONLY 120 M | THERMO LT ARROW 90 M | THERMO RT ARROW 90 M | THERMO STR & RT ARROW 90 M | THERMO STR ARROW 90 M | 4" WHITE PAINT | 4" YELLOW PAINT | YELLOW & YELLOW MARKERS | CRYSTAL & RED MARKERS | INDUCTIVE LOOP SAWCUT | LEAD-IN CABLE (14-2) |  |              |            |
|--------------------|-------------|--------|-------|--------------------------------------|-----|-------|-----------|--------|-------|---------------------------|------------------------|--------------------------|-------------------------|-------------------------|--------------------------|-------------------------|-----------------------|----------------------|----------------------|----------------------------|-----------------------|----------------|-----------------|-------------------------|-----------------------|-----------------------|----------------------|--|--------------|------------|
| 1CR.10661.28       | Northampton | 1      | NC 48 | FROM GASTON ECL TO NC 46             | 1   | 2     | 2WU       | 0.54   | 27    | 0.312                     | 7,200                  | 7,120                    | 710                     | 15                      | 170                      | 6                       |                       | 4                    | 1                    | 2                          | 1                     | 7,910          | 7,120           | 40                      | 10                    |                       |                      |  |              |            |
| 1CR.10661.28       | Northampton | 2      | NC 48 | FROM NC 46 TO END C&G                | 2   | 2     | MU        | 0.51   | 48    | 0.295                     |                        | 6,750                    | 940                     | 60                      |                          |                         | 8                     | 15                   | 4                    |                            | 2                     | 940            | 6,750           | 70                      | 40                    | 1,500                 | 250                  |  |              |            |
| 1CR.10661.28       | Northampton | 3      | NC 48 | FROM END C&G TO ROANOKE RIVER BRIDGE | 3   | 2     | 2WU       | 0.68   | 26    | 0.393                     | 7,300                  | 7,730                    | 40                      |                         |                          |                         |                       |                      |                      |                            |                       | 7,340          | 7,730           | 50                      |                       |                       |                      |  |              |            |
| <b>GRAND TOTAL</b> |             |        |       |                                      |     |       |           |        |       | <b>1.73</b>               |                        | <b>14,500</b>            | <b>21,600</b>           | <b>1,690</b>            | <b>75</b>                | <b>170</b>              | <b>6</b>              | <b>8</b>             | <b>19</b>            | <b>5</b>                   | <b>2</b>              | <b>3</b>       | <b>16,190</b>   | <b>21,600</b>           | <b>160</b>            | <b>50</b>             |                      |  | <b>1,500</b> | <b>250</b> |
|                    |             |        |       |                                      |     |       |           |        |       |                           | <b>23,290</b>          |                          |                         |                         |                          | <b>14</b>               |                       | <b>29</b>            |                      |                            | <b>37,790</b>         |                | <b>210</b>      |                         |                       |                       |                      |  |              |            |

### High Speed Detection [≥40 mph (64 km/hr)]

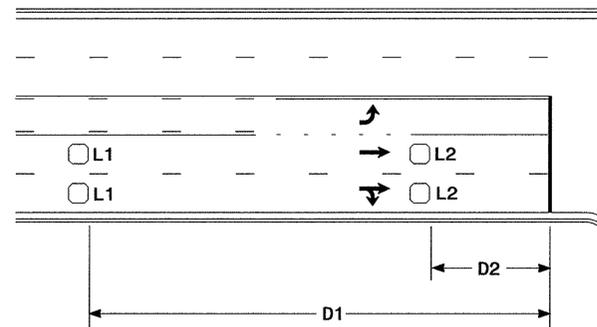


| Speed Limit<br>mph (km/hr) | D<br>ft (m) |
|----------------------------|-------------|
| 40 (64)                    | 250 (75)    |
| 45 (72)                    | 300 (90)    |
| 50 (80)                    | 355 (110)   |
| 55 (88)                    | 420 (130)   |

L = 6ft X 6ft (1.8m X 1.8m)  
Wired in series for TS1  
Controllers  
Wired separately for TS2,  
170, and 2070L Controllers

Volume Density Operation

OR

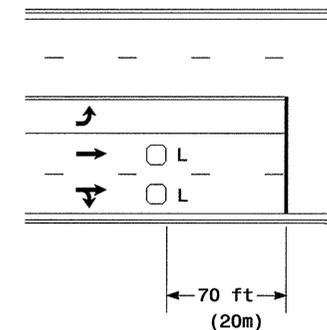


| Speed Limit<br>mph (km/hr) | D1<br>ft (m) | D2<br>ft (m) |
|----------------------------|--------------|--------------|
| 40 (64)                    | 250 (75)     | 80 (25)      |
| 45 (72)                    | 300 (90)     | 90 (27)      |
| 50 (80)                    | 355 (110)    | 100 (30)     |
| 55 (88)                    | 420 (130)    | 110 (35)     |

L1 = 6ft X 6ft  
(1.8m X 1.8m)  
Wired in series  
L2 = 6ft X 6ft  
(1.8m X 1.8m)  
Wired in series

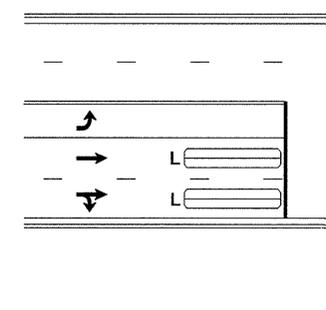
"Stretch" Operation

### Low Speed Detection [≤35 mph (56 km/hr)]



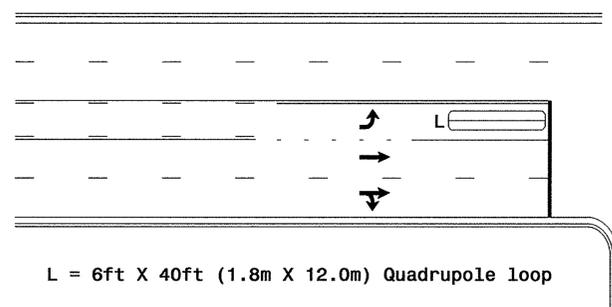
L = 6ft X 6ft (1.8m X 1.8m)  
Wired in series

OR



L = 6ft X 40ft (1.8m X 12.0m)  
Quadrupole loop, wired separately

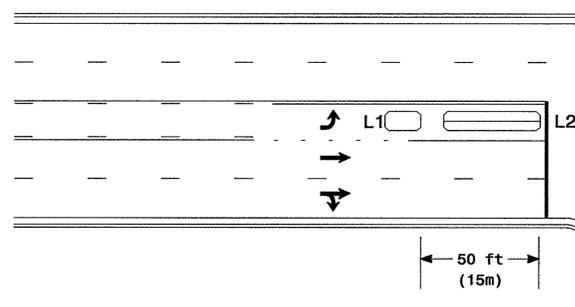
### Left Turn Lane Detection



L = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop

Presence Loop Detection

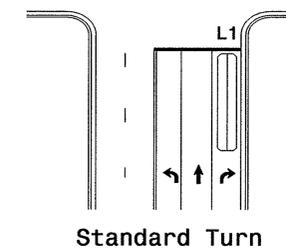
OR



L1 = 6ft X 15ft (1.8m X 4.6m) Queue detector  
L2 = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop

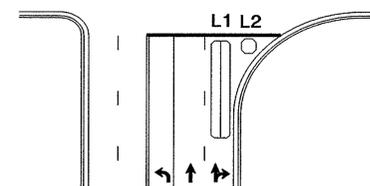
Queue Loop Detection

### Right Turn Lane Detection

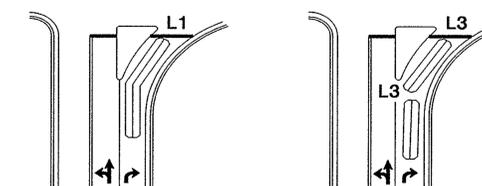


Standard Turn

L1 = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop  
L2 = 6ft X 6ft (1.8m X 1.8m) [Minimum] Presence loop  
Wired separately  
L3 = 6ft X 20ft (1.8m X 6.0m) Quadrupole loop  
Wired in series

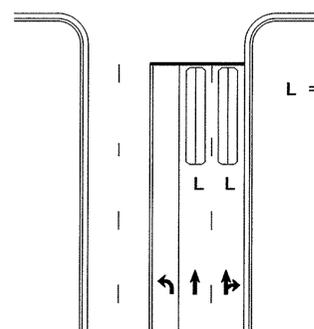


Wide Radius Turn



Channelized Turn

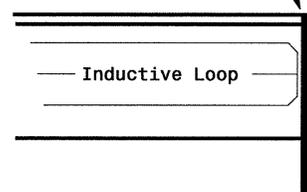
### Side Street Detection



L = 6ft X 40ft (1.8m X 12.0m)  
Quadrupole loop  
Wired to separate  
detectors/channels

### Presence Loop Placement at Stop Lines

Locate loop slightly  
behind leading  
edge of stop line



Note:  
Loop may be located in advance  
of stop line when stop line is  
greater than 15' (4.5m) from edge  
of intersecting roadway; or, when  
loop detects a permissive or  
protected/permissive left turn.

### Recommended Number of Turns

Single 6' X 6' (1.8m X 1.8m)  
loop (wired separately):

| Length of<br>Lead-in<br>ft (m) | Number<br>of Turns |
|--------------------------------|--------------------|
| < 250 (75)                     | 3                  |
| 250-375 (75-115)               | 4                  |
| 375-525 (115-160)              | 5                  |
| > 525 (160)                    | 6                  |

Quadrupole loops: Use 2-4-2 turns  
6' X 15' (1.8m X 4.6m) Loops:  
Lead-in < 150' (45 m), use 2 turns  
Lead-in > 150' (45 m), use 3 turns

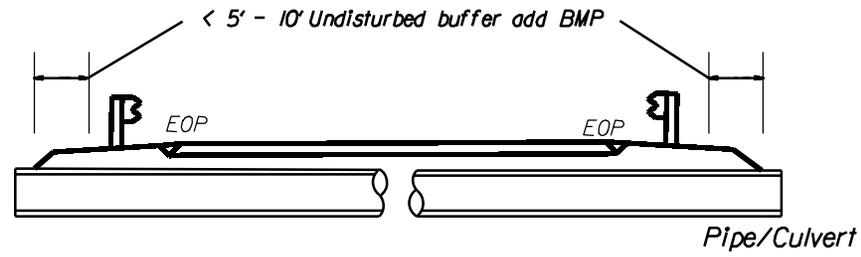
|   |                                     |                     |                           |
|---|-------------------------------------|---------------------|---------------------------|
|   | <p>Typical Loop Locations</p>       |                     |                           |
|   | <p>PLAN DATE: June 2006</p>         | <p>REVIEWED BY:</p> |                           |
| <p>SCALE<br/>N/A</p>                                | <p>PREPARED BY: P. L. Alexander</p> | <p>REVIEWED BY:</p> | <p>SIGNATURE DATE</p>     |
| <p>REVISIONS</p> <p>1. Revise pavement markings</p> |                                     | <p>INIT. DATE</p>   | <p>SIG. INVENTORY NO.</p> |

NOTES: Less than 5' - 10' undisturbed buffer from ROW, ditchline, water feature, or drainage inlet, add BMP.

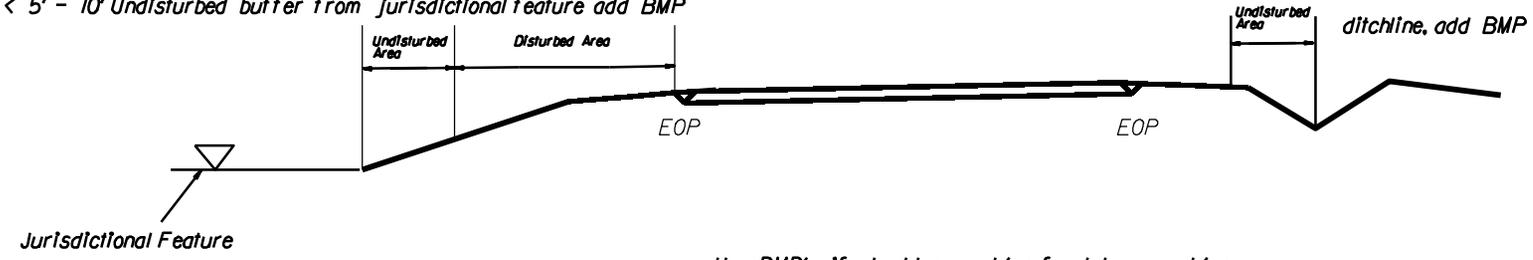
BMP Options: Wattle or Silt Fence

# EROSION CONTROL DETAIL

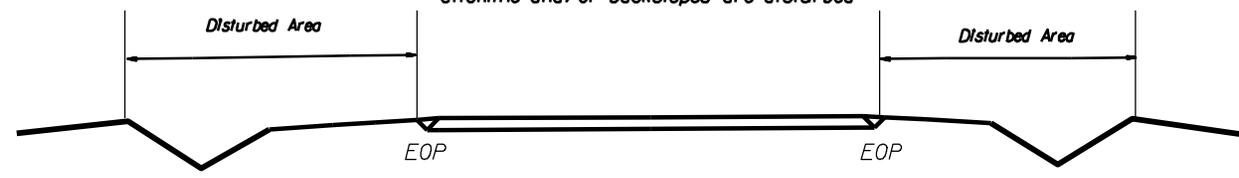
|                         |                        |
|-------------------------|------------------------|
| PROJECT NUMBER: 10-1111 | SHEET NO. 15-11/001/12 |
| RAW SHEET NO.           |                        |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER    |



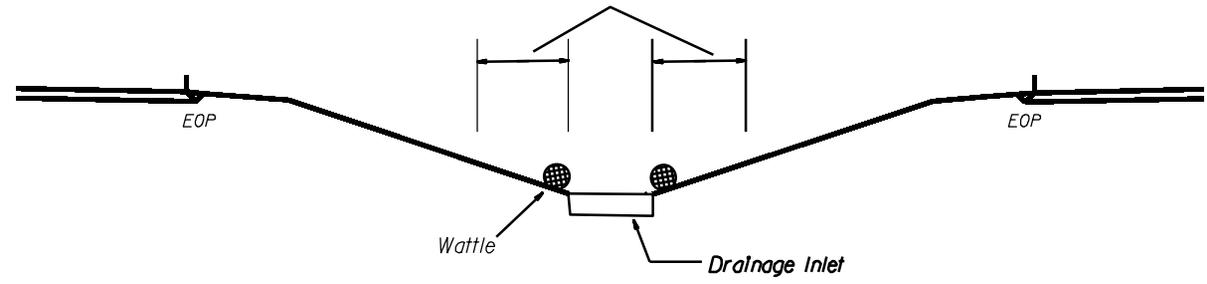
< 5' - 10' Undisturbed buffer from jurisdictional feature add BMP



Use BMP's if shoulders and/or frontslopes and/or ditchline and/or backslopes are disturbed



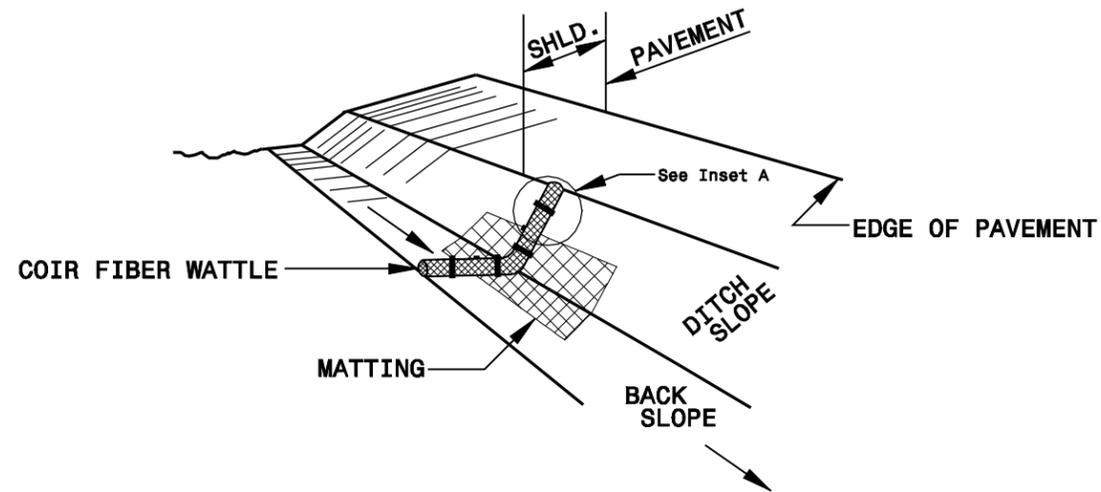
< 5' - 10' Undisturbed buffer from inlet, add wattle



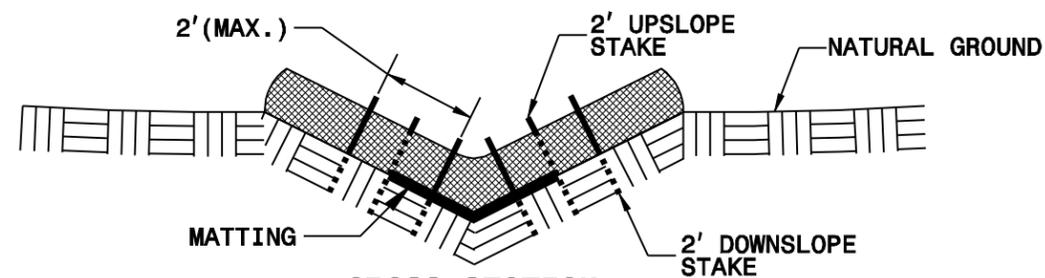
NOT TO SCALE

|                                 |  |                        |  |
|---------------------------------|--|------------------------|--|
| PROJECT REFERENCE NO.<br>X-XXXX |  | SHEET NO.<br>EC-26     |  |
| RDW SHEET NO.                   |  |                        |  |
| ROADWAY DESIGN<br>ENGINEER      |  | HYDRAULICS<br>ENGINEER |  |

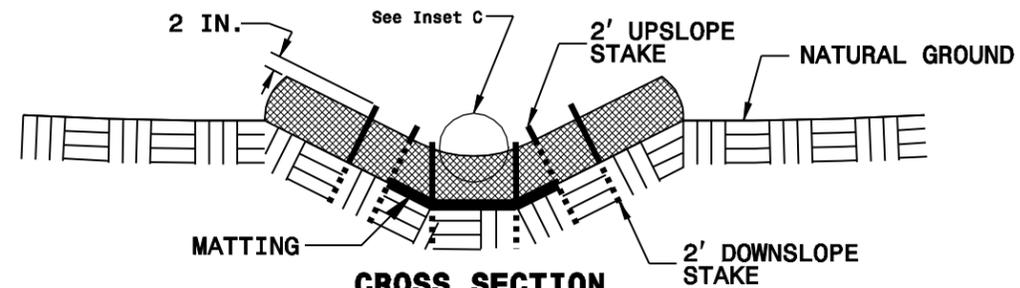
# COIR FIBER WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL



**ISOMETRIC VIEW**



**CROSS SECTION VEE DITCH**



**CROSS SECTION TRAPEZOIDAL DITCH**

**NOTES:**

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.

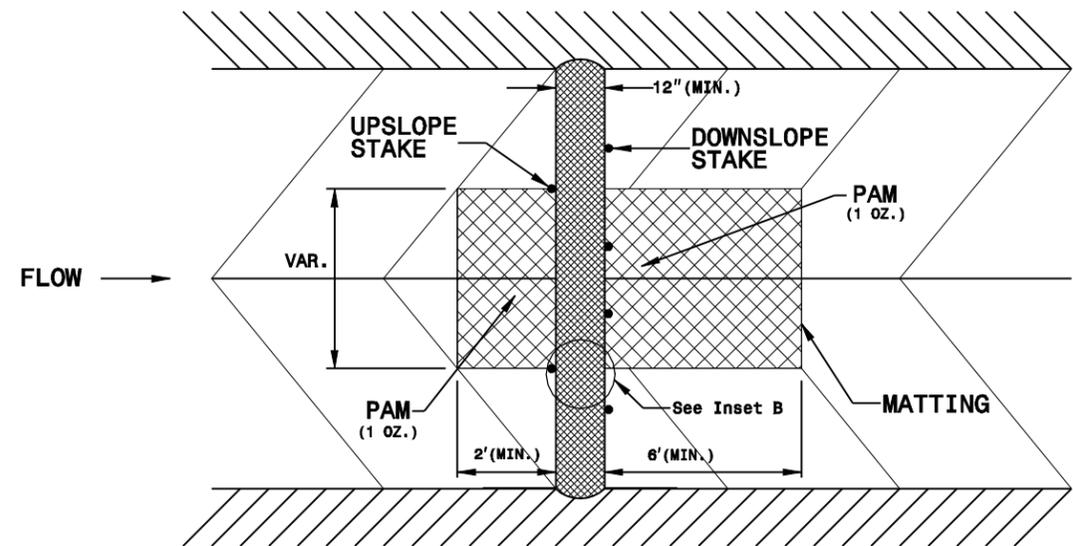
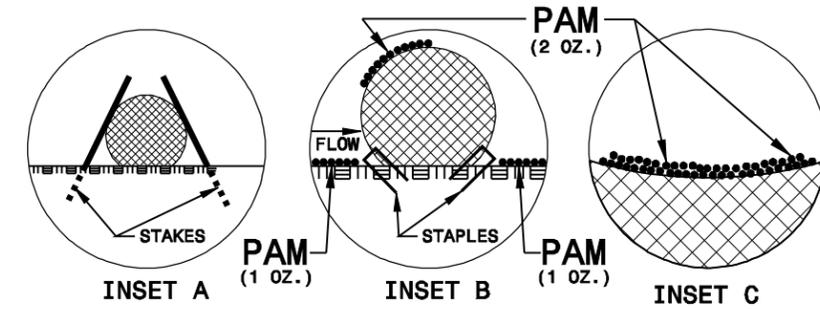
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.

INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH WATTLE.

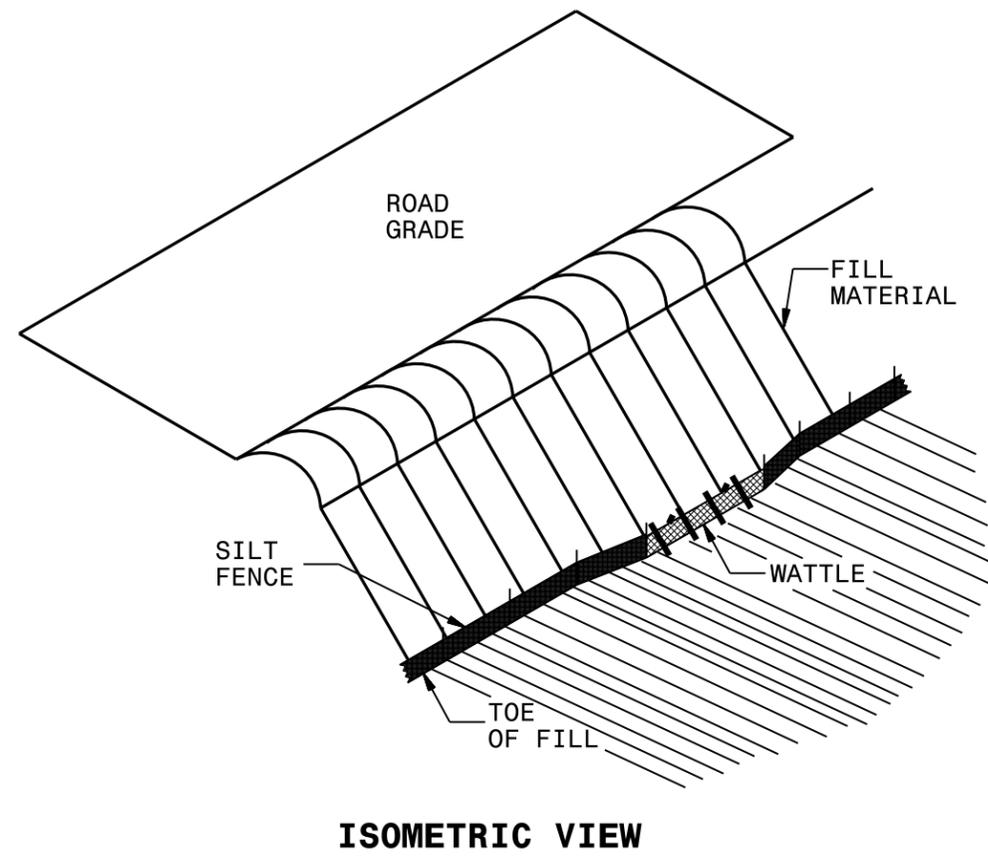
INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF PAM ON MATTING ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.



**TOP VIEW**

# SILT FENCE COIR FIBER WATTLE BREAK DETAIL

|                                 |  |                     |  |
|---------------------------------|--|---------------------|--|
| PROJECT REFERENCE NO.<br>X-XXXX |  | SHEET NO.<br>EC-2G  |  |
| RW SHEET NO.                    |  |                     |  |
| ROADWAY DESIGN ENGINEER         |  | HYDRAULICS ENGINEER |  |



**NOTES:**

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE AND LENGTH OF 10 FT.

EXCAVATE A 1 TO 2 INCH TRENCH FOR WATTLE TO BE PLACED.

DO NOT PLACE WATTLE ON TOE OF SLOPE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.

PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.

INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

WATTLE INSTALLATION CAN BE ON OUTSIDE OF THE SILT FENCE AS DIRECTED.

INSTALL TEMPORARY SILT FENCE IN ACCORDANCE WITH SECTION 1605 OF THE STANDARD SPECIFICATIONS.

**INSET A**

